No. 739,071. Patented September 15, 1903.

UNITED STATES PATENT OFFICE.

EMILE A. FOURNEAUX, OF NEW YORK, N. Y., ASSIGNOR TO HERMAN A. METZ, OF NEW YORK, N. Y.

PROCESS OF DYEING BROWN.

SPECIFICATION forming part of Letters Patent No. 739,071, dated September 15, 1903.

Application filed December 6, 1902. Serial No. 134,190. (No specimens.)

To all whom it may concern:

Be it known that I, EMILE A. FOURNEAUX, Ph. D., a citizen of the United States, residing in New York, borough of Manhattan, and State of New York, have invented certain new and useful Improvements in Processes of Producing Brown Shades on Cotton and on Silk Fabrics, of which the following is a specification.

The production of brown shades on cotton fabrics by the oxidation of aromatic bases in itself is well known. Such browns were produced soon after the discovery of anilin-black by the oxidation of certain naphthylamin compounds; but their use has been discontinued long since, because the shades no longer answered the requirements of the trade. Mention has also been made in the literature of dyeing of certain bases—like, for instance, benzidin—giving browns by similar oxidation; but these bases have never been used in the arts, because the shades obtained were of no practical value.

I have observed that by oxidizing on the fiber certain aromatic metadiamino compounds, more especially those derived from benzene and its homologues, under suitable conditions beautiful brown shades of great fastness can be produced very simply and economically. The most suitable oxidizing agent for the purpose consists in metallic chlorates in the presence of copper, cerium, or other of the well-known salts capable of transferring oxygen by catalytic action. Aluminium chlorate gives the best results. The presence of a certain amount of a mineral acid in the form of the corresponding salt of the base is necessary. The amounts of mineral acid and of the oxidizing agent must be carefully gaged, as an excess of either leads to partial destruction of the dye. Certain organic acids, especially oxalic acid, can also be used; but the results are not quite as good as when mineral acids are used.

The process of oxidizing aromatic metadiamino compounds gives strong and bright shades of brown, which possess the desirable cast of the well-known manganese-bronze and which can be produced by this process in a simpler and cheaper manner than it has been possible to produce them heretofore. These brown shades can also be resisted, both in printing and dyeing, by reducing and by alkaline substances, the most suitable resist being a concentrated solution of neutral potassium sulfite suitably thickened and mixed with an alkali, alkaline salt, or a metallic oxid, preferably oxid of zinc. This is preferably printed on the fabric before the brown shade is developed thereon.

The invention consists in producing a fast-brown shade on cottom and on silk fabrics by oxidizing on or in the fiber an aromatic meta-diamino compound, and more especially one belonging to the benzene series—metaphenyl-enediamin, its homologues, or its products of substitution. This constitutes a marked improvement in the art of printing on and dyeing of cotton fabrics.

For printing on cotton fabrics the following example of a printing-color has given good results: To six hundred parts thickening are added forty parts of sodium chlorate dissolved in sixty parts of water, thirty parts of aluminium chlorid of 52° Twaddell, and forty parts of metatoluylenediamin dissolved in twenty-seven parts of hydrochloric acid of thirty per cent. and one hundred parts of water, and forty parts of a copper-sulfid paste containing twenty-five per cent. copper sulfid mixed with eighty parts of water. The thickening mentioned in this formula is an ordinary acetic wheat-starch thickening as commonly used in the art of printing. After the color is printed on the goods they are dried and the color developed by a short steaming or aging, then submitted to the usual processes of washing, soaping, and drying. The copper sulfid in this formula can be substituted by other substances acting in a similar capacity—for instance, cerium salts—while the metaphenylendiamin can be substituted by other aromatic metadiamino compounds, their homologues, or substitution products, while the mixture of sodium chlorate and aluminium chlorid, yielding aluminium chlorate, gives the best results. I do not wish to be understood as limiting myself to that particular mode of oxidation.

For dyeing the new brown on the fiber the following dyeing liquor is employed: Two hundred parts of tragacanth are mixed with one

hundred parts of water. Forty parts of metatoluylenediamin are dissolved in twenty-seven parts of hydrochloric acid of thirty per cent., fifty parts of acetic acid, (fifty per cent.,) and one hundred and fifty parts of water. Forty parts of sodium chlorate are dissolved in one hundred parts of water. Twenty parts of aluminium chlorid of 52° Twaddell are diluted with one hundred parts of water. These several solutions are mixed together and finally mixed with fifty parts of a cerium-chlorid solution containing two parts of cerium oxid and fifty parts of a copper-chlorid solution containing one part crystallized copper chlorid.

The process is as follows: Pad the fabric with the solution, dry on cans or in hot air. Then develop by exposing to hot air and moisture or by a short steaming or aging. Then wash and soap.

As regards the constitution of my new brown color, it is unknown, like that of anilin-black, to which it is closely related; but it differs essentially from the diamin-browns referred to. The diamin-browns are sulfonated azo compounds derived from benzidin and containing a naphthalene group. My brown does not and cannot contain a sulfo group, an azo group, a naphthalene group, or benzidin, as none of these groups or compounds are used in its preparation or liable to be formed during the process of manufacture. The absence of all these groups can also be proved quite independently of the mode of preparation of my dye by its reactions and analytically, if necessary.

It may be added that this process has given good results not only with cotton piece-goods, but also with other cotton fabrics, such as warps, yarn, hosiery, knit goods, and so on, also with raw cotton, silk, and half-silk fabrics.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The process herein described of producing brown shades on cotton and on silk fabrics, which consists in oxidizing in or on the fiber an aromatic metadiamino compound, substantially as set forth.

2. The process herein described of producing brown shades on cotton and on silk fabrics, which consists in oxidizing on or in the fiber an aromatic metadiamino compound belonging to the benzene series, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EMILE A. FOURNEAUX.

Witnesses:
C. P. GOEPEL,
HENRY J. SUHRBIER.